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STATE LIVE STOCK SANITARY BOARD

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Questions and Answers Relating to Tuberculosis of Cattle.

A great many questions in relation to tuberculosis of cattle have been received by the State Veterinarian and frequently appear in nearly all of the agricultural papers, so it is very evident that there exists a general demand for information on this subject. The answers to many of these questions and some of the statements made in reference to this disease are so extravagant and wide of the mark that in some places there is much confusion and doubt as to the whole subject.

This is extremely unfortunate, because the matter is most important and can only be managed by the application of accurate information and cool judgment. Many of the published statements regarding bovine tuberculosis are not in accordance with known facts and existing conditions.

The questions following are selected from among those that the writer is called upon to answer most frequently, and it is believed that the answers are conservative statements of clearly established facts.

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What is tuberculosis?

Tuberculosis is a disease of warm blooded animals that is caused by a very minute vegetable organism known as the tubercle bacillus. A person affected with tuberculosis is said to have consumption, the two names refer to the same disease. It is characterized by the appearance of small growths or nodules, called tubercles, in various parts of the body, which break down and their interiors become filled with a yellow cheesy-like debris. If a number of tubercles develop close together they may run into each other and thus form a large mass of diseased tissue. All parts of the body which are in a tuberculous condition contain the tubercle bacillus and in many cases the germs pass from these areas of disease into the blood or into the lymph, are carried to distant parts of the body and there start new areas of disease.

Is tuberculosis a new disease?

No. Tuberculosis is one of the oldest diseases of which there is any record, but much of our knowledge in regard to it is recent, and more attention has been called to it of late years than previously and because so much more is heard about it now the impression has arisen with some that it is a new disease. It is, however, more prevalent among cattle now than formerly and excepting where active measures for its suppression have been employed it is undoubtedly spreading. This fact has been proven beyond doubt by the inspections made under the direction of the Live Stock Sanitary Board of this State and by the experience of investigators in other states.

What animals are affected by tuberculosis?

No class of warm-blooded animals is entirely free from this disease, but some species present a greater predisposition or susceptibility to it than others. Named in the order of predis-

position, we have the following list (excluding mankind): Cattle, swine, horses, dogs, sheep, goats.

What causes tuberculosis?

The tubercle bacillus.

What is the tubercle bacillus?

The germ that causes tuberculosis. It was shown by Robert Koch, a German scientist, in 1882, that tuberculosis is caused by the tubercle bacillus. With the announcement of his discovery, Koch stated that "It is possible to say that tubercle bacilli are not only the cause of tuberculosis, but they are the only cause and without tubercle bacilli there can be no tuberculosis." Experiments and researches made in all parts of the world for the past sixteen years have only served to emphasize and strengthen this statement.

The tubercle bacillus is so small that it can only be seen and studied with the aid of a high power microscope, it appears like a slender rod and is so short that if twenty of the bacilli were placed end to end they would span a distance about equal to the thickness of this paper. The germ does not grow or multiply outside of the living animal, but it may preserve its life and capacity for doing harm for a long time. It is destroyed by direct sunlight in from a few minutes to several hours, according to the thickness of its covering. Strong, diffuse daylight destroys it in from five to seven days, but in dark, dirty and protected places it lives and remains active for weeks or months. It is destroyed by boiling or by the lower temperature of 185 degrees F., or by certain disinfectants, but will withstand great cold and even freezing and again grow and multiply when given favorable conditions.

Are there any other primary causes of tuberculosis?

No. There are, however, a number of conditions that tend to facilitate the distribution of the tubercle bacilli and make

animals predisposed or susceptible to their action and these conditions are frequently confused with the true cause of the disease. They may be regarded as secondary causes.

What is the meaning of susceptibility or predisposition?

These expressions relate to the adaptability of an animal to the growth of the germs of a disease. Any condition that makes it easier for disease-producing germs to grow in an animal increase the predisposition or susceptibility of that animal to disease. Under certain conditions, animals do not contract diseases that they are exposed to, because their tissues are not in a state that is favorable to the growth of the germs of such diseases; just as some soils are not favorable to the growth of some seeds.

What are the conditions that increase the susceptibility of animals to tuberculosis?

Among the most important are the following:

Heredity. It was formerly thought that tuberculosis was frequently inherited directly, but all of the investigations that have been devoted to this subject during recent years show that such is not the case and that instances in which animals are born with tuberculosis are of the greatest rarity; but where an animal has tuberculous parents it is often born with a weak constitution and is usually exposed to the disease from the beginning of its life, so the chances are in favor of its acquiring it.

Close Stabling. If there is a tuberculous animal in a herd, the disease spreads most rapidly when this animal is brought into close contact with its associates, because then the germs pass into the healthy animals most readily and in the greatest abundance. Hence, close stabling and bad ventilation have a great deal to do with the rapid extension of tuberculosis in a herd.

Food. Tubersulosis cannot be caused by food unless it contains the germs of the disease. That is, unless it is derived from a tuberculous animal or has been contaminated by the products of a tuberculous animal. Improper feeding that leads to weakening of the constitution, will predispose to tuberculosis and favor the progress of the disease in animals exposed to the cause of it. There is no ground for the statement that tuberculosis is caused by silage.

Excessive Milk Yield. This acts as a predisposing cause to tuberculosis only when it exceeds the strength of the cow or when a prolific cow does not receive food of the quantity and quality that are necessary to restore the material taken from her system in the milk.

How is tuberculosis conveyed to healthy animals?

1. Through the breathing organs. The tuberculous material coming from the body of a tuberculous animal and containing the germs of tuberculosis may dry and pass into the air as dust and be inhaled by healthy animals and this may lead to the development of the disease in their breathing organs.

2. Through the digestive organs. Food or water that have been contaminated by the expectorations of tuberculous cattle may produce the disease in the digestive organs of animals habitually fed upon it. The milk from some tuberculous cows may also produce tuberculosis in animals fed upon it.

3. Through wound in the skin. This happens but rarely.

4. Through the organs of generation. This occurs when the male or female sexual organs are tuberculous.

Can milk containing the germs of tuberculosis cause tuberculosis in animals fed upon it?

Yes. There is an abundance of proof to the effect that tuberculosis of calves and swine is very often produced in this

way, and numerous carefully conducted feeding experiments irresistibly lead to the same conclusion.

Can milk containing the germs of tuberculosis also cause tuberculosis in people?

Yes.

Under what conditions is the milk of tuberculous cows dangerous?

This question can be best answered by quoting from the resolutions adopted at the 1896 meeting of the United States Veterinary Medical Association, a meeting participated in by veterinarians from all parts of North America, and representatives of a large number of veterinary schools, agricultural experiment stations and the government service.

> "The milk from cows with tuberculous udders may cause tuberculosis in animals fed upon it. The milk from cows with extensive tuberculosis but apparently healthy udders may in some cases contain the germs of tuberculosis and cause the disease in animals fed upon it. In some cases the germs of tuberculosis appear in the milk of tuberculous cows that are not far advanced in the disease and that have udders that are healthy so far as can be determined by an examination made during the life of the animal. Slightly tuberculous cows sometimes succumb to a sudden exacerbation of tuberculosis and furnish virulent milk for a period before it is possible to discover their condition by means of a physical examination."

This statement represents the opinion of the most careful students of the subject.

Can the meat of tuberculous cattle cause tuberculosis in the animals or people that eat it?

The meat of cattle with tuberculosis in certain stages, or tuberculosis of the intermuscular lymphatic glands may con-

tain the germs of tuberculosis, and if it is eaten raw or in an imperfectly cooked condition so that these germs are not destroyed, tuberculosis may result from eating such meat.

On the other hand, when tuberculous animals are killed under proper inspection and it is found that the carcass is not emaciated and the disease is not generalized or too wide spread. the flesh may be regarded as safe for human consumption. When the flesh of tuberculous animals is used as food it should be well cooked.

What are the symptoms of tuberculosis?

Tuberculosis begins in such a variety of organs and in such a variety of ways that it is not characterized by a definite set of symptoms. The evidence of the disease depends entirely upon its location and extent. Among the most common symptoms are the following: Coughing; abortion; general unthriftiness and emaciation, with good appetite; frequent bloating; appearance of hard lumps in the udder; enlarged lymphatic glands about the throat, and dizziness. ANY OR ALL OF THESE SYMPTOMS MAY BE ENTIRELY ABSENT IN ANIMALS IN WHICH THE DISEASE IS WIDESPREAD AND EXTENSIVE, therefore the absence of these symptoms is not a proof of freedom from tuberculosis.

In what condition are the organs of a tuberculous animal after death?

This depends upon the age of the disease, the conditions under which it has developed, and the organs affected. The surface of a tuberculous organ is frequently rough and presents numerous little elevations that somewhat resemble small toadstools. These are of a pinkish or yellowish color and usually some of them contain yellow cheesy material or pus. The lining of the chest or abdomen may be thickly studded with these

growths. The lymphatic glands in any part of the body, but especially those connected with the lungs, intestines and throat are frequently enlarged and contain the cheese-like material above mentioned. The lungs and other organs may contain large abscesses or the surface of a hollow organ may be ulcerated. In beginning cases, the changes are very slight, because tuberculosis always starts as a local disease and is, for a time, confined to a single small tubercle.

May an animal that does not present external symptoms of tuberculosis be afflicted with the disease to a degree that renders it dangerous to its associates or to the consumers of its milk?

Yes.

How may one recognize cases of tuberculosis that do not present external symptoms of the disease?

By the application of the tuberculin test.

What is tuberculin?

Tuberculin is a brownish fluid made from cultures of the germs of tuberculosis, but it does not contain either dead or living germs of tuberculosis, because it has been sterilized by heating, thus killing the germs, and filtered through porcelain, so that after they are destroyed they are completely removed from the fluid.

What is the tuberculin test?

This test is applied to an animal for the purpose of determining whether it is free from or afflicted with tuberculosis. In making it, it is necessary to determine the normal temperature of the animal and then inject a small quantity of tuberculin (average dose equivalent to about 4 drops of the undiluted fluid). If the animal has tuberculosis, the temperature will become elevated within from eight to sixteen hours after the injection, but if it does not suffer from tuberculosis, the temperature is not influenced. While the test is being made it

is necessary that certain definite conditions should be observed. These are described in detail in a separate publication (Circular No. 1).

Is the tuberculin test injurious to healthy cattle?

No. When properly applied, the tuberculin test cannot injure an animal and although several thousand tests have been made under the direction of the State Live Stock Sanitary Board, not one report of injury ascribable to the test has been made.

Is the tuberculin test reliable?

The resolutions cited above contain the following declaration:

"We find that tuberculin properly used for diagnostic purposes is entirely harmless to healthy cattle and is so exceedingly accurate in its effects that the few errors resulting from its use cannot affect the general results, and are of less frequent occurrence than follow the use of any other method of diagnosing internal disease."

This opinion is fully borne out by the experience of the State Live Stock Sanitary Board.

Does tuberculin point out the extent or severity of the disease as well as its existence?

No. By the use of tuberculin one can only determine the existence of the disease but not its extent or severity.

Is it necessary to destroy all cattle that respond to the tuberculin test?

In view of the fact that tuberculosis is not a disease that tends to recovery, excepting a small percentage of cases, and since one cannot tell just to what degree a cow that has responded to the tuberculin test may be dangerous, there is but

one safe course to follow, namely: to remove the animal from the herd. If it is desirable to keep an animal that has responded to the tuberculin test, it must be kept by itself, apart from healthy cattle and fed and watered and stabled in a special apartment. It should be cared for by a separate attendant and the use of its milk must be discontinued, except after heating to a point that will insure the destruction of the germs of tuberculosis. If all this is done, and if the animal does not pass into the hands of an innocent or careless person, there can be no objection to keeping a tuberculous animal alive.

When such an animal is slaughtered, its flesh should not be used for food until after it has been passed upon by a competent inspector, and such inspection would in many cases result in the destruction of the entire carcass.

In this connection, attention is called to the following extract from the resolutions previously cited: "Slightly tuberculous cows sometimes succumb to a sudden exacerbation of tuberculosis and yield virulent milk for a period before it is possible to discover their condition by means of a physical examination."

Can tuberculosis be cured?

Unfortunately, no cure for tuberculosis has yet been discovered. This is a subject which has received the most earnest attention of the highest scientific investigators, but their work has been unsuccessful thus far. Under unusually favorable conditions and in strong individuals it sometimes happens that the disease becomes latent and in these cases it may not shorten the life of the animal. Where the disease is at all extensive this is impossible and in almost every case, these latent spots of disease may become active at any time.

How may a herd be freed from tuberculosis?

By removing the cattle that respond to the tuberculin test, disinfecting the surroundings, bettering the sanitary conditions, and, in short, by removing all possible channels by which tubercle bacilli may come within the reach of healthy cattle.

Is there any other, easier way?

None has yet been found.

How may a herd be kept free from tuberculosis?

By starting with healthy cattle, keeping them rationally and adding no animal to the herd that is not from an equally sound herd or that has not been proven to be free from tuberculosis by the application of the tuberculin test. It is also important to avoid the products of tuberculous animals by refusing hay or fodder kept over a stable of tuberculous cows, or skim milk from a creamery supplied by a large number of patrons, unless it is known that the entire milk product is derived from healthy cattle or unless the milk has been heated to 185 degrees F.

What assistance is offered by the State Live Stock Sanitary Board to those who wish to rid their herds from this disease?

The State Live Stock Sanitary Board will inspect herds in which there is sufficient reason for the belief that tuberculosis exists, upon the receipt of an application from the owner in which he promises to do all in his power to prevent the reintroduction of tuberculosis among his cattle and to observe the precautions and measures recommended for this purpose by the Board. Tuberculous cattle that are found after an examination made under these conditions, are appraised at not to exceed $25.00 per head for common or grade cattle, or $50.00 for registered cattle. After appraisement, the tuberculous animals are destroyed, unless the owner wishes to keep them

in quarantine at his own expense. The premises occupied by tuberculous animals must, in all cases, be thoroughly disinfected.

Details in reference to this matter can be obtained by corresponding with the undersigned, who is Secretary of the State Live Stock Sanitary Board.

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